Delaware Economic Development Office dedo.delaware.gov Innovation@work.

Cascading of tunable optical filter elements

Description of Technology: A tunable optical signal device and method of using the same having at least two filter elements, each of said filter elements being made of a material having an adjustable parameter, wherein the adjustable parameter is maintained at slightly different values for adjacent filter elements.

Patent Listing:

1. **US Patent No.** 6,256,428**,** Issued on July 3, 2001, "Cascading of tunable optical filter elements" http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,256,428.PN.&OS=PN/6,256,428&RS=PN/6,256,428

Market Potential: There are several tunable filter technologies that have been developed, chief among them acousto-optic tunable filter (AOTF) as disclosed in (No. 4) and Fabry-Perot tunable filter (FPTF). AOTF's, based on the acousto-optic effect present in ferroelectric materials such as lithium niobate, work by using an acoustic wave, stimulated by a radio-frequency power supply and transducer, to induce densification and rarefaction in an optical waveguide material. In practice, AOTF's usually work by changing the polarization of light that is at a wavelength that is matched to the acoustically induced grating. This light may then be separated from the other wavelength components present. AOTF's have the advantages of providing very rapid tuning (microseconds) and complete blanking of the filter (when the radio-frequency power is removed). However, it is very difficult to achieve the spectral characteristics desired for WDM by this approach, in terms of isolation between different wavelength channels, insertion loss at a given wavelength channel, and, in particular, polarization independence. FPTF's have been worked both in bulk embodiments as disclosed in (No. 5), and, more recently, via micromechanical approaches as disclosed in (No. 6). While FPTF's can achieve relatively good filter performance, they have the disadvantage of requiring a physical movement to achieve tuning, which reduces the overall reliability.

An ideal tunable filter technology would have both the solid state tuning of AOTF's coupled with the good filter performance of FPTF's.

Benefits:

- Solid state tuning of AOTF's coupled wit the good filter performance of FPTF's.

Applications:

- Tunable optical signal device

Contact:
Delaware Economic Development Office
Direct: (302) 577-8477**,** Fax: (302) 577-8499